

In the Office Action, the Examiner rejected claims 1, 2, 4-6, and 9-13<sup>1</sup> under 35 U.S.C. § 102(b) as being anticipated by Drage et al. (U. S. Patent No. 4,790,258); rejected claims 1-4, 9-11, 13, and 16-17<sup>2</sup> under 35 U.S.C. § 102(b) as being anticipated by Tepman (U. S. Patent No. 5,951,775); and rejected claims 7, 8, 14, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Drage et al. in view of Morita et al. (U. S. Patent No. 5,815,366). Upon entry of the present amendment, the rejection of claims 2 and 10-16 are rendered moot.

Applicant respectfully traverses the rejections under 35 U.S.C. §§ 102(b) and 103(a).

Regarding the rejection of claims 1, 4-6, 9, and 17-18 under 35 U.S.C. § 102(b) as being anticipated by Drage et al., Applicant submits that Drage et al. does not teach each and every element of these claims.

The present application is in general related to an electrostatic chuck system. Particularly, claim 1 recites, among other things, "a lift structure . . . including a lift base, and at least one lift pin removably coupled with the lift base, the lift pin having two ends with a first end removably coupled to the lift base and a second end for supporting the semiconductor wafer during lifting operation of the lift structure, wherein the first end of the lift pin is threaded and the lift base has a threaded hole for receiving the first end of the lift pin."

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<sup>1</sup> The Examiner also appears to reject claims 17 and 18 over Drage et al. based on his discussion of claims 17 and 18 at page 3 of the Office Action.

<sup>2</sup> The Examiner also appears to reject claim 18 over Tepman based on his discussion of claims 17 and 18 at page 4 of the Office Action.

Drage et al. discloses a pin lift mechanism for plasma processing of semiconductor wafers. According to Drage et al., “[a] lower electrode 21 comprises a plurality of bores 22 in which nonmetallic sleeve 25 is inserted and sealed thereto, for example, by an O-ring and an O-ring compression screw 26. Into bore 22 and the chamber formed by non-conductive sleeve 25, is inserted pin 23 and magnetic slug 24.” Col. 2, lines 16-21.

In the Office Action, the Examiner alleged that Drage et al. discloses “a chuck platform (11) for supporting [a] semiconductor wafer, lift structure (shown in fig. 1) movably coupled to the platform to receive the wafer, including a lift base (14) and at least one lift pin (pin 23 shown in fig. 2) removably coupled to the base, the lift pin having two ends with a first end removably coupled to the base and the second end coupled for supporting the wafer during operation of the lift structure (see col. 2, lines 48-51), the lift structure (see fig. 1) has an external thread on the first end of the lift pin and a matching internal thread in a hole provided by the lift base (14) to [removably] couple the lift pin and the base.” Office Action, page 2.

Applicant disagrees with the Examiner in combining Figs. 1 and 2 of Drage et al., because Fig. 1 shows the prior art, while Fig. 2 shows Drage et al.’s embodiment. Since Fig. 1 and Fig. 2 disclose two different apparatus structures, pin 23 of Fig. 2, allegedly corresponding to Applicant’s claimed lift pin, is not coupled with plate 14 of Fig. 1.

Moreover, according to Drage et al., “[e]nclosing plate 14 and the lower portions of pins 13, as well as a portion of rod 16, is wall 18 which defines an enclosed volume 17. . . . Thus, when the system is evacuated or purged, chamber 17 must be

evacuated or purged as well. In addition, depending upon the process being run, corrosive gases may enter chamber 17 by way of bores 12, causing undesirable side effects . . .” Col. 2, lines 4-13. Clearly, Drage et al. requires eliminating volume 17 enclosing plate 14 as shown in Fig. 1 and instead including pin 23 inserted into sleeve 25 as shown in Fig. 2 “to reduce the time necessary for pumping down and/or purging a plasma processing system.” Col. 1, lines 35-37. Therefore, according to Drage et al., pin 23, allegedly corresponding to Applicant’s claimed lift pin, **cannot** be coupled with plate 14, allegedly corresponding to Applicant’s claimed lift base.

As a result, Drage et al. at least fails to teach “a lift base, and at least one lift pin removably coupled with the lift base, the lift pin having two ends with a first end removably coupled to the lift base and a second end for supporting the semiconductor wafer during lifting operation of the lift structure,” as recited in claim 1. Moreover, because Drage et al. fails to teach at least “a lift base,” it also fails to teach at least “wherein the first end of the lift pin is threaded and the lift base has a threaded hole for receiving the first end of the lift pin,” as recited in claim 1.

Therefore, independent claim 1 is patentable over Drage et al. under 35 U.S.C. § 102(b). Claims 4-6, and 9, which depend from independent claim 1, are also allowable over Drage et al. at least because of their dependencies from an allowable base claim.

On page 3 of the Office Action, the Examiner also rejected claims 17 and 18, alleging that Drage et al. discloses “a method of maintaining a lift structure of a chuck wafer that supports a semiconductor wafer comprises [providing] a removable lift pin (23), removing the first pin [from] the lift base (col. 2, lines 48-52), mounting a second

pin (13) to the lift base (14)(see fig. 1 and 2)." Applicant respectfully traverses this rejection.

For similar reasons as set forth above, Drage et al.'s pin 23 cannot be coupled to plate 14, and Drage et al. fails to teach at least "a lift base". Therefore, Drage et al. fails to teach at least "providing a removable first lift pin to a lift base in the lift structure; removing the first lift pin from the lift base with the lift structure being coupled to the chuck system; and mounting a second lift pin to the lift base with the lift structure being coupled to the chuck system," as recited in independent claim 17. As a result, claim 17 is patentable over Drage et al., and claim 18, which depends from claim 17, is also patentable over Drage et al. at least because of its dependency from an allowable base claim.

Applicant further traverses the rejection of claims 1, 3-4, 9, and 17-18 as being anticipated by Tepman under 35 U.S.C. § 102(b).

Tepman discloses a removable deposition shield for processing chambers. The chambers may include a support member 16, which "may be attached . . . to a conventional vertically movable elevator system 18," wherein "the substrate support 16 is mounted to the elevator 18 for vertical movement relative to an arrangement of pins 30-30 which themselves are moved vertically by a second vertical lift or elevator mechanism 32." See col. 2, line 65 - col. 3, line 6, and col. 4, lines 23-26. On page 3 of the Office Action, the Examiner appears to argue that the part shown in Tepman's Fig. 2 to which pins 30 are attached (not numbered, referred to as pin holder hereinafter) corresponds to Applicant's claimed lift base. However, as shown in Fig. 2, Tepman discloses that each of lift pins 30 is coupled to the pin holder with two bolts, rather than

with threads. Therefore, Tepman fails to teach at least “a lift base, and at least one lift pin . . . , wherein [a] first end of the lift pin is threaded and the lift base has a threaded hole for receiving the first end of the lift pin,” as recited in claim 1.

As a result, claim 1 is allowable over Tepman under 35 U.S.C. § 102(b). Claims 3-4 and 9, which depend from claim 1, are also allowable over Tepman at least because of their dependency from an allowable base claim.

Additionally, claim 17 recites “[a] method of maintaining a lift structure of a chuck system that supports a semiconductor wafer, comprising: providing a removable first lift pin to a lift base in the lift structure; removing the first lift pin from the lift base with the lift structure being coupled to the chuck system; and mounting a second lift pin to the lift base with the lift structure being coupled to the chuck system.” Applicant notes that Tepman does not teach “a method of maintaining a lift structure” whatsoever in its disclosure. See col. 4, lines 22-39. Therefore, claim 17 is patentable over Tepman under 35 U.S.C. § 102(b). Claim 18, which depends from claim 17, is also patentable over Tepman at least because of its dependency from an allowable base claim.

Regarding the rejection of claims 7 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Drage et al. in view of Morita et al., Applicant first submits that, as discussed above, Drage et al. fails to teach or suggest each and every element of claim 1. Particularly, Drage et al. at least fails to teach “a lift base, and at least one lift pin removably coupled with the lift base, the lift pin having two ends with a first end removably coupled to the lift base and a second end for supporting the semiconductor wafer during lifting operation of the lift structure, wherein the first end of the lift pin is

threaded and the lift base has a threaded hole for receiving the first end of the lift pin,” as recited in claim 1.

Morita et al. discloses an electrostatic chuck, wherein “[an] ejector pin housing 19 consists of a housing base 19b of stainless steel (JIS-SUS316), with bores 19c for seating the springs 20 being formed therein, and a housing top 19a made of polyimide. The ejector pins 16 are fixed to individual pin flanges 18, which are connected to the ejector pin housing 19 through the individual springs 20 seated in the bores 19c.” Col. 4, lines 50-56, and Fig. 2 of Morita et al. Applicant notes that Morita et al. does not teach or suggest at least “at least one pin removably coupled with the lift base”, and therefore does not teach or suggest at least “the lift pin having two ends with a first end removably coupled to the lift base . . . , wherein the first end of the lift pin is threaded and the lift base has a threaded hole for receiving the first end of the lift pin,” as recited in claim 1. Therefore, Morita et al. does not overcome the above-mentioned deficiencies of Drage et al.

Furthermore, Applicant notes the fact that Drage et al. eliminates plate 14, allegedly corresponding to Applicant’s claimed lift base, shows that Drage et al. actually teaches away from the present invention. Applicant also submits that one skilled in the art would not have been motivated to combine Morita et al.’s teachings with Drage et al., because Morita et al. clearly shows using a housing top 19a enclosed in the ejector pin housing 19. See Drage et al., col. 1, lines 35-37, and col. 2, lines 4-13, and Morita et al., col. 4, lines 50-53, and Fig. 2. Therefore, Drage et al. and Morita et al., taken alone or in combination, actually teach away from Applicant’s claim 1, and there would be no reasonable expectation of success required to sustain an obviousness rejection.

**APPENDIX TO AMENDMENT FILED ON JULY 21, 2003**

Amended claims:

1. (Amended) A chuck system for supporting a semiconductor wafer, comprising:  
a chuck platform for supporting the semiconductor wafer; and  
a lift structure movably coupled with the chuck platform to receive the semiconductor wafer, including  
a lift base, and  
at least one lift pin removably coupled with the lift base, the lift pin having two ends with a first end removably coupled to the lift base and a second end for supporting the semiconductor wafer during lifting operation of the lift structure,  
wherein the first end of the lift pin is threaded and the lift base has a threaded hole for receiving the first end of the lift pin.

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Thus, claim 1 is allowable over Drage et al. and Morita et al. under 35 U.S.C. § 103(a), and claims 7 and 8, which depend from independent claim 1, are also allowable over Drage et al. in view of Morita et al. at least because of their dependency from an allowable base claim.

Finally, Applicant submits that new claim 19 is also allowable over Drage et al., Tepman, or Drage et al. in view of Morita et al. at least because of its dependency from allowable independent claim 1. Moreover, none of Drage et al., Tepman, and Drage et al. teaches "a driving mechanism for driving the lift structure, wherein the lift base of the lift structure includes at least one mounting hole for mounting the lift structure to the driving mechanism, and wherein the mounting hole is positioned closer to the center of the lift base than the lift pin," as recited in new claim 19. Therefore, Applicant respectfully requests that new claim 19 be allowed.

In view of the foregoing remarks, Applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims 1, 3-9, and 17-19.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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